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supporting a release-independent frequency band
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Contents

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

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- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

1 Scope

The present document specifies requirements for Rel-15 UEs supporting release independent features like:

- additional E-UTRA operating frequency bands on top of Rel-15 of TS 36.101 [2] and TS 36.133 [3];
- additional E-UTRA CA configurations (intra-band/inter-band) on top of Rel-15 of TS 36.101 [2] and TS 36.133 [3];
- additional operating bands and/or CA configurations for specific features (like UE category 0, M1, NB1);
- other release independent features (like 4Rx antenna port, high speed scenario, 8Rx antenna port).

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 36.101: "Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) Radio Transmission and Reception".

NOTE: The considered release is given in the text of the present document that uses [2].

[3] 3GPP TS 36.133: "Evolved Universal Terrestrial Radio Access (E-UTRA); Requirements for Support of Radio Resource Management".

[4] 3GPP TS 36.306: "Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio access capabilities".

NOTE: The considered release is given in the text of the present document that uses [4].

[5] Void

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

release independent: applicable to some frozen releases, starting from a certain release Rel-M

NOTE 1: Normally, a feature is introduced only in the latest open release Rel-N and future releases are based on the previous one so that future releases inherit the requirements of this feature. Introducing a feature "in a release independent way from Rel-M onwards" (M<N) means it was decided by TSG RAN that this feature would be also beneficial in previous, already frozen releases starting with Rel-M until Rel-(N-1). In order to avoid touching TS 36.101 [2] or TS 36.133 [3] of these frozen releases, the corresponding requirements are captured in TS 36.307 via pointers to [2] or [3] of the release in which the feature was introduced.

NOTE 2: Release independent does not mean applicable to all releases.

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

4Rx	4 UE receiver antenna ports
CA	Carrier Aggregation
CRS	Cell-specific Reference Signal
CSI	Channel State Indicator
FDD	Frequency Division Duplex
LAA	License-Assisted Access
RRC	Radio Resource Control
RRM	Radio Resource Management
SDR	Sustained Data Rate
TDD	Time Division Duplex
UE	User Equipment

3.3 Symbols

For the purposes of the present document, the following symbols apply:

N	Release in which a feature is introduced into TS 36.101 [2] or TS 36.133 [3]
M	Release from which onwards (including release M) a feature is release independent

3A Release independent features

3A.0 General

TSG-RAN has agreed for certain features (see the following clauses) to introduce them in a "release independent way".

This means for each feature:

- it is "introduced" in a release N, i.e. TS 36.101 [2] and TS 36.133 [3] of release N define certain UE requirements for this feature; the feature is indicated in the tables of the following clauses;
- it is "release independent" starting from a release M (M<N); M for the given feature is provided in the tables of the following clauses;
- UEs supporting this feature have to fulfill additional requirements in release M or higher which are specified in one or more Annexes of TS 36.307 of release N; the applicable Annexes for a given feature are provided in the tables of the following clauses.

The applicable UE Categories are specified in TS 36.306 [4] according to the release to which the UE conforms.

3A.1 Additional E-UTRA operating bands

Requirements for a Rel-15 UE for additional E-UTRA operating bands compared to TS 36.101 Rel-15 [2] are introduced via this clause.

Table 3A.1-1: E-UTRA operating bands and UE power class

Feature	Duplex-mode	Release independent from	Requirements to be fulfilled (see TS 36.307 of the release in which the band was introduced)
Operating bands, band number <= 64, Power Class 3	FDD, TDD	Rel-8	Table B.2.1-1, Table B.4.1-1
Operating bands, band number > 64, Power Class 3	FDD, TDD	Rel-9	Table B.2.1-1, Table B.4.1-1
Operating bands, NS-value > 32	FDD, TDD	Rel-10	Table B.2.1-1, Table B.4.1-1
Asymmetric operating bands, Power Class 3	FDD	Rel-10	Table B.2.1-1, Table B.4.1-1
Operating bands, band number <= 64, Power Class 1	FDD	Rel-10	Table B.2.1-1, Table B.4.1-1
Operating bands, Power Class 2	TDD	Rel-10	Table B.2.1-1, Table B.4.1-1

For example, Band 19 was introduced in the Release 9 specifications. In order to implement a UE conforming to Release 8 but supporting Band 19, it is necessary for the UE to additionally conform to some parts of the Release 9 specifications (see corresponding Annexes of TS 36.307 Rel-9 which will point to the requirements in the Rel-9 of TS 36.101 [2] or TS 36.133 [3] to be fulfilled), such as the radio frequency and radio resource management requirements for the Band 19.

3A.2 Additional E-UTRA CA configurations

Requirements for a Rel-15 UE for additional E-UTRA CA configurations compared to TS 36.101 Rel-15 [2] are introduced via this clause.

Table 3A.2-1: Intra-band contiguous CA configurations and UE CA power class

Feature	DL/UL	CA BW Class	Duplex-mode	Release independent from	requirements to be fulfilled (see 36.307 of the REL in which the CA configuration and the power class were introduced)
Intra-band contiguous CA configurations, power class 3	DL	B	FDD	Rel-10	Table B.2.2-1, Table B.3.2-1, Table B.4.2-1
		C	FDD, TDD	Rel-10	Table B.2.2-1, Table B.3.2-1, Table B.4.2-1
		D	TDD	Rel-10	Table B.2.2-1, Table B.3.2-1, Table B.4.2-1
		E	TDD	Rel-11	Table B.2.2-1, Table B.3.2-1, Table B.4.2-1
		F	TDD	Rel-12	Table B.2.2-1, Table B.3.2-1, Table B.4.2-1
	UL	B	FDD	Rel-10	Table B.2.2-1, Table B.3.2-1, Table B.4.2-1
		C, D	FDD, TDD	Rel-10	Table B.2.2-1, Table B.3.2-1, Table B.4.2-1
Intra-band contiguous CA configurations, power class 2	UL	C	TDD	Rel-10	Table B.2.2-1, Table B.3.2-1, Table B.4.2-1
NOTE1: The duplex mode "FDD, TDD" refers to a CA configuration composed by only FDD bands or only TDD bands, respectively.					

Table 3A.2-2: Inter-band CAconfigurations

Feature	DL/UL	number of bands	number of CCs	CA BW Classes	Duplex-mode	Release independent from	requirements to be fulfilled (see 36.307 of the REL in which the CA configuration was introduced)
Inter-band CA configurations	DL	2	2-4	A, B, C	FDD, TDD	Rel-10	Table B.2.4-1, Table B.3.2-1, Table B.4.3-1 or Table B.4.4-1
			2-5	D, E	FDD, TDD	Rel-11	Table B.2.4-1, Table B.3.2-1, Table B.4.3-1 or Table B.4.4-1
			2-5	A, B, C, D, E	FDD and TDD	Rel-12	Table B.2.4-1, Table B.3.2-1, Table B.4.3-1 or Table B.4.4-1
			6-7	A, C, D, E, F	FDD, TDD	Rel-14	Table B.2.4-1, Table B.3.2-1, Table B.4.3-1 or Table B.4.4-1
			6-7		FDD and TDD	Rel-14	Table B.2.4-1, Table B.3.2-1, Table B.4.3-1 or Table B.4.4-1
		3	3	A	FDD, TDD	Rel-10	Table B.2.4-1, Table B.3.2-1, Table B.4.3-1 or Table B.4.4-1
			3-5	B, C, D	FDD, TDD	Rel-11	Table B.2.4-1, Table B.3.2-1, Table B.4.3-1 or Table B.4.4-1
			3	A	FDD and TDD	Rel-12	Table B.2.4-1, Table B.3.2-1, Table B.4.3-1 or Table B.4.4-1
			6-7	A, C, D, E, F	FDD, TDD	Rel-14	Table B.2.4-1, Table B.3.2-1, Table B.4.3-1 or Table B.4.4-1
			6-7		FDD and TDD	Rel-14	Table B.2.4-1, Table B.3.2-1, Table B.4.3-1 or Table B.4.4-1
		4	4-5	A, C	FDD, TDD	Rel-11	Table B.2.4-1, Table B.3.2-1, Table B.4.3-1 or Table B.4.4-1
			4-5		FDD and TDD	Rel-12	Table B.2.4-1, Table B.3.2-1, Table B.4.3-1 or Table B.4.4-1
			6-7	A, C, D, E	FDD, TDD	Rel-14	Table B.2.4-1, Table B.3.2-1, Table B.4.3-1 or Table B.4.4-1
			6-7		FDD and TDD	Rel-14	Table B.2.4-1, Table B.3.2-1, Table B.4.3-1 or Table B.4.4-1
		5	5	A	FDD, TDD	Rel-12	Table B.2.4-1, Table B.3.2-1, Table B.4.3-1 or Table B.4.4-1
			5		FDD and TDD	Rel-12	Table B.2.4-1, Table B.3.2-1, Table B.4.3-1 or Table B.4.4-1
			6-7	A, C, D	FDD, TDD	Rel-14	Table B.2.4-1, Table B.3.2-1, Table B.4.3-1 or Table B.4.4-1
			6-7		FDD and TDD	Rel-14	Table B.2.4-1, Table B.3.2-1, Table B.4.3-1 or Table B.4.4-1
		6	6	A	FDD	Rel-14	Table B.2.4-1, Table B.3.2-1, Table B.4.3-1 or Table B.4.4-1
	UL	2	2-4	A, C	FDD, TDD	Rel-11	Table B.2.4-1, Table B.3.2-1, Table B.4.3-1 or Table B.4.4-1

			2-3	A, C	FDD and TDD	Rel-12	Table B.2.4-1, Table B.3.2-1, Table B.4.3-1 or Table B.4.4-1
NOTE1: The duplex mode "FDD, TDD" refers to a CA configuration composed by only FDD bands or only TDD bands, respectively. The duplex mode "FDD and TDD" refers to a CA configuration including both FDD and TDD bands.							
NOTE2: CA configurations involving downlink only operation in Band 46 are release independent from Rel-13 onwards (LAA was introduced in Rel-13). The 10 MHz channel bandwidth for Band 46 was introduced in TS 36.101 Rel-14 [2] and can be implemented in a release independent way from Rel-13.							

For example, CA configuration CA_1A-19A was introduced in the Release 11 specifications. In order to implement a UE conforming to Release 10 but supporting the CA configuration CA_1A-19A, it is necessary for the UE to additionally conform to some parts of the Release 11 specifications (see corresponding Annexes of TS 36.307 Rel-11 which will point to the requirements in the Rel-11 of TS 36.101 [2] or TS 36.133 [3] to be fulfilled), such as the radio frequency and radio resource management requirements for the CA configuration CA_1A-19A.

Table 3A.2-3: Intra-band non-contiguous CA configurations

Feature	DL/UL	number of sub-blocks	number of CCs	CA BW Classes	Duplex-mode	Release independent from	requirements to be fulfilled (see 36.307 of the REL in which the CA configuration was introduced)
Intra-band non-contiguous CA configurations	DL	2	2-5	A, C, D	FDD, TDD	Rel-11	Table B.2.3-1, Table B.3.2-1, Table B.4.5-1
		3	3-5	A, C	FDD, TDD	Rel-11	Table B.2.3-1, Table B.3.2-1, Table B.4.5-1
	UL	2	2	A	FDD	Rel-11	Table B.2.3-1, Table B.3.2-1, Table B.4.5-1
NOTE1: The duplex mode "FDD, TDD" refers to a CA configuration composed by only FDD bands or only TDD bands, respectively.							

3A.3 Additional operating bands and/or CA configurations for specific features

For a specific feature introduced in an earlier release, it may be decided in a later release to apply this specific feature in a release independent way for additional operating bands and/or CA configurations. For a Rel-15 UE corresponding requirements are then introduced via this clause.

Table 3A.3-1: Operating bands for specific features